Appendix 7

Port Macquarie Hastings Council - *Correspondence – June 2010*

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11/6/10 - 8

PORT MACQUARIE
HASTINGS

Your Ref:
Refers to:

8 June 2010

Tierney Property Services
ATTENTION: Mr Brian Tierney
P O Box 493
PORT MACQUARIE NSW 2444

Dear Brian

AREA 14 SVF – Traffic Issues MP 06_0085 & MP 7_0001

Council provides the following comments regarding roadwork and traffic issues in Area 14 for inclusion in the environmental assessment supporting the above Part 3A applications.

Reference is made to Concept Plan E4 – Revision M dated 28-01-10 attached.

1. All intersections have been identified and modelled in the Roadnet Report. In the absence of any additional supporting information Council maintains that all intersections are required. Council is progressing preliminary design of these intersections in order to provide accurate costing for inclusion in the contributions plan.

2. The intersection between Bonny View Close and Ocean Drive is expected to remain a "T" intersection until such time as the Southern School site proceeds. Costs associated with upgrading this particular intersection will be borne by the development on the Southern School site.

3. Council has undertaken a review of the merit of the proposed road link across the open space corridor and advises that it is no longer required. Council will require a pedestrian and cycleway link across the corridor in this location. The ultimate design of this link will be determined as part of the Voluntary Planning Agreement but as a minimum will need to accommodate cyclists, pedestrians and scooters, be above the 1:20 flood level and lit in accordance with the AS 1158.

...../Over 2

4. Council acknowledges that the neighbouring parties have been coordinating infrastructure and access across property boundaries for some time. Council has been advised that there is a memorandum of understanding between the parties and that there are no significant issues that require Council's involvement at this stage.

5. Council has reviewed the proposed road hierarchy illustrated in the attached plan. This road hierarchy is generally consistent with the Area 14 Master Plan and has been modelled in the Roadnet report. The road network has Council's in principle support.

6. Council is in the process of engaging a Consultant to prepare a Corridor Plan for Ocean Drive through Area 14. The Corridor Plan will review the traffic impact assessment and the noise report and provide a plan for Ocean Drive that addresses the noise, amenity and function characteristics of the corridor.

Please contact the undersigned if you wish to discuss this matter further on 65818111 or cliff.toms@pmhc.nsw.gov.au

Yours sincerely

Cliff Toms
Technical Services Manager
Infrastructure Services

Attached:

Luke & Co – Concept Plan E4 (Revision M: 28-01-10)

Appendix 8

Roadnet Traffic Impact Study – April 2010

RoadNet

FINAL REPORT
Traffic Impact Study

Area 14 Urban Investigation Area (Ocean Drive between Lake Cathie and Bonny Hills)

for

Port Macquarie Hastings Council

April 2010

SYSTEM CERTIFICATION ISO 9001:2008 SGS

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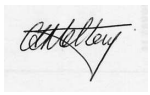
Document Status	**Final**

Task	Responsibility	Signature
Prepared by:	Craig Nethery	
Reviewed by:	Brian Kerwick	

Craig Nethery is a Design Technician with over 20 years experience in road design and traffic engineering.

Craig commenced work with Hastings Council working on designs for roads and traffic management schemes at Lighthouse Beach Port Macquarie, Ocean Drive Lake Cathie and roadwork at Wauchope and Laurieton before moving to RoadNet as Senior Road Designer. He is a member of the Institute of Public Works Engineering Australia and an accredited Traffic Controller and Road Safety Auditor.

Brian Kerwick is an experienced traffic planner with 34 years experience.

Brian has a degree in Environmental Planning and has qualifications in road design and traffic engineering. He is a member of the Australian Institute of Traffic Planning and Management, the Planning Institute of Australia and is a Lead Road Safety Auditor. Brian worked for the NSW Roads and Traffic Authority for 18 years in design, traffic, environmental planning and road safety positions and has had 16 years in consulting. He is the Managing Director of RoadNet.

Brian has completed numerous Traffic Impact Assessments for developments across NSW and Southeast Queensland.

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Executive Summary

Main Report

1.0 Executive Summary

Area 14 is a future residential area located between the existing townships of Lake Cathie and Bonny Hills. The 180 hectare parcel of land will cater for almost 10,000 future residents with schools, sporting fields, community facilities, in addition to commercial and light industrial precincts, while preserving open space and habitat corridors.

Ocean Drive, which runs through the western portion of the future growth area, is an arterial road which will connect Area 14 with the Camden Haven area to the south and Port Macquarie to the north. Recent growth in these coastal centres in recent years has seen traffic along Ocean Drive increase dramatically.

Houston Mitchell Drive is located adjacent to the proposed Area 14 precinct and connects Ocean Drive to the Pacific Highway. Development of the existing coastal townships and Area 14 will result in a large increase in traffic volumes on Ocean Drive and turning movements at the Houston Mitchell Drive / Ocean Drive intersection.

Manual traffic counts were taken at the intersections of Ocean Drive with Bonny View Drive, Houston Mitchell Drive and Abel Tasman Drive to determine current traffic volumes and intersection movements. Traffic volumes to be generated by the proposed Area 14 development were then estimated based upon the land use types and at various stages of development. Estimates of future traffic volumes on Ocean Drive were also derived, based upon estimates of future growth in the neighbouring townships, as provided by Council.

Modelling (Paramics) of various traffic networks has been undertaken to provide information regarding the capacity of the existing road network to cater for the proposed population and traffic growth, and to investigate options for future road upgrades and intersection treatments.

The modelling showed that Ocean Drive and associated roads within the study area are currently operating well within capacity. However, the roads do not have the capacity to cater for future growth, and the following upgrades and intersection treatments are recommended by 2019 (partial development):

- Ocean Drive requires two lanes northbound between Bonny View Drive and Abel Tasman Drive;
- Houston Mitchell Drive / Ocean Drive requires upgrading to a signalised intersection, which provides two through lanes along Ocean Drive. Pedestrian crossings are recommended across the Houston Mitchell Drive, Primary School Access and the southern approach of Ocean Drive;
- Houston Mitchell Drive requires two lanes eastbound between Forest Parkway and Ocean Drive with a 'Keep Clear' to be line marked at the give way intersection at the Industrial Precinct access;
- a signalised intersection is required on Ocean Drive at the proposed Commercial Precinct;
- Bonny View Drive / Ocean Drive requires upgrading to a roundabout with two lane approaches and circulating lanes;
- Abel Tasman Drive / Ocean Drive intersection requires upgrading to a signalised intersection with two lane approaches.

- a new roundabout intersection is required along Ocean Drive between Abel Tasman Drive and the Commercial Precinct. This roundabout requires two lane approaches and circulating lanes; and
- four lanes (two lanes in each direction) are required along Ocean Drive between the Houston Mitchell Drive and the Commercial Precinct.

By 2029 (full development), the following road network improvements are required:

- Ocean Drive requires four lanes (two lanes in each direction) between Bonny View Drive and Abel Tasman Drive;
- Houston Mitchell Drive / Ocean Drive intersection requires two right turn lanes from Ocean Drive north to Houston Mitchell Drive;
- Houston Mitchell Drive requires four lanes (two lanes in each direction) between Forest Parkway and Ocean Drive;
- The signalised intersection fronting the commercial precinct requires two lane approaches from both the commercial precinct in the south and residential area in the north. The right turn lane from Ocean Drive to the Commercial Precinct requires extension to 165 metres.

During the final stages of this project, RoadNet personnel attended two Area 14 Working Group Meetings where the Paramics Modelling was presented as preliminary and preliminary final modelling for the project. After these meetings the Working Group provided comments on the modelling. These comments were considered and where appropriate incorporated into the model.

The Draft Report was circulated to key stakeholders for comment. Submissions were received from two companies (King and Campbell and Tierney Property Services) representing affected landowners. They raised issues in relation to the degree of road infrastructure upgrading required. Council's Technical Services Manager requested that the modelling be reviewed in light of the comments. Accordingly, a peer review was undertaken by RoadNet's Transport Planner.

The review concluded that the modelling contained in the study is sound and satisfactorily reflects likely future traffic conditions for the road networks considered. It also raises wider network planning issues such as the need to upgrade Houston Mitchell Drive and address access and safety issues at its junction with the Pacific Highway. A copy of the review is included in Appendix A and should be read in conjunction with this report.

The following Figures show the network improvements required in 2019 and 2029.

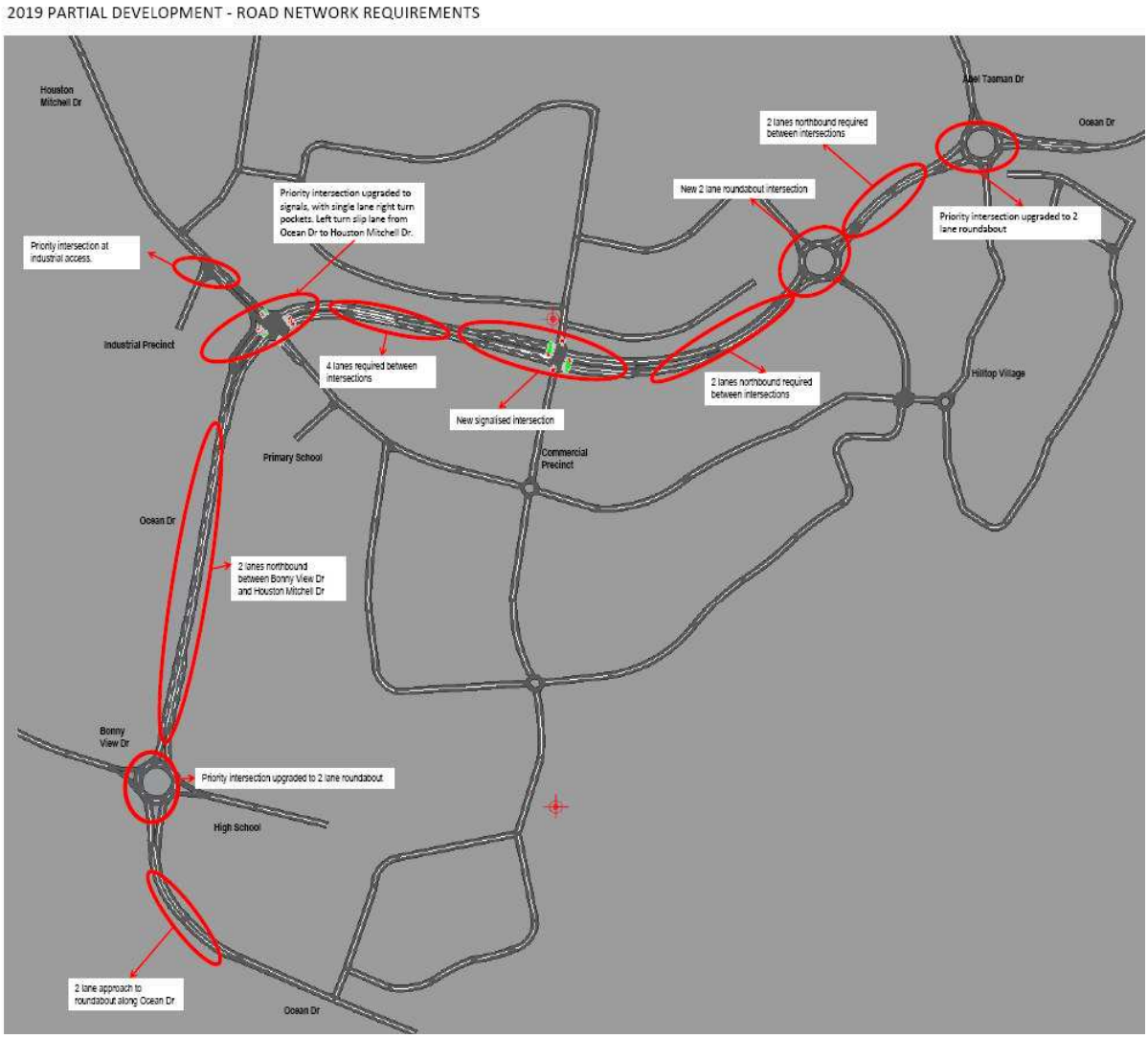

Figure 1.0: Intersection requirements for 2019

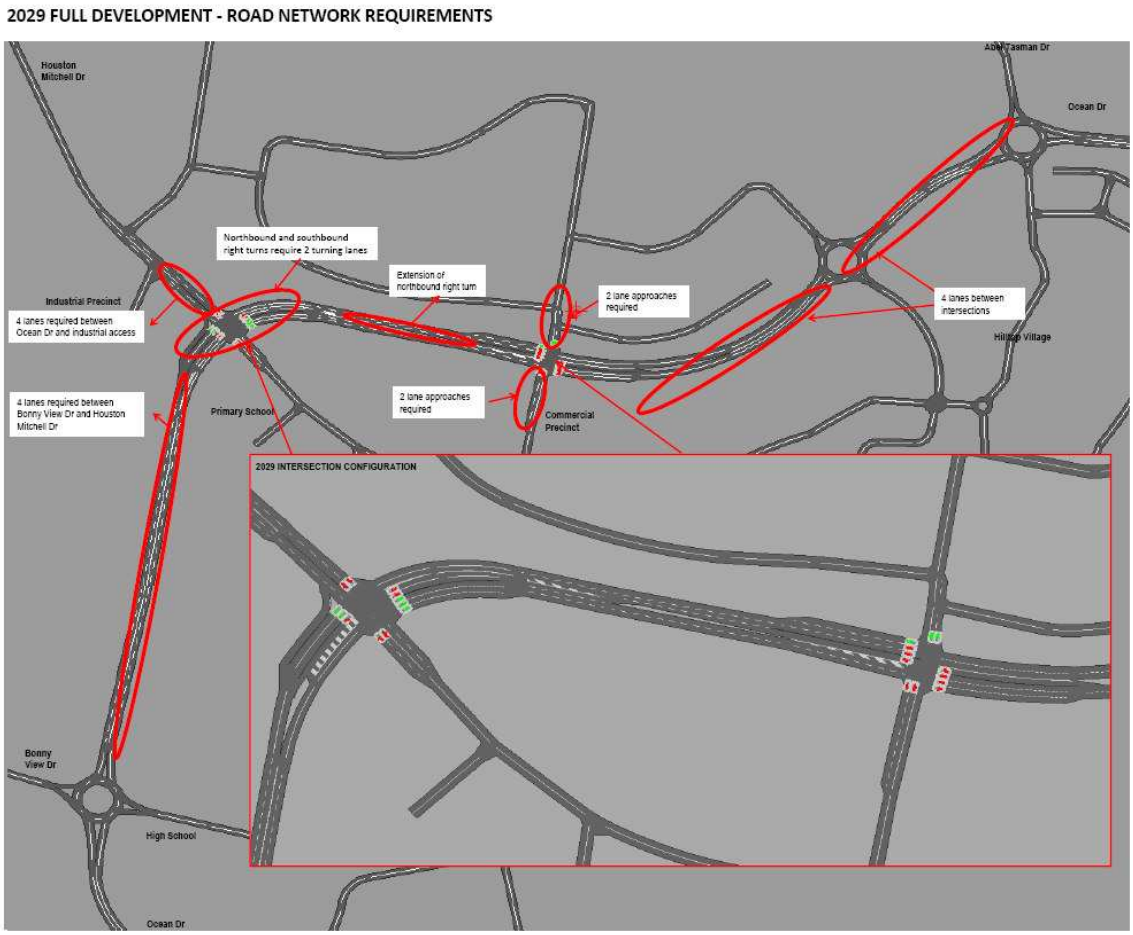

Figure 1.1: Road Network and improvements 2029

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FINAL REPORT
Traffic Impact Study

Area 14 Urban Investigation Area
(Ocean Drive between Lake Cathie and Bonny Hills)

for

Port Macquarie Hastings Council

April 2010

SYSTEM CERTIFICATION ISO 9001:2008 SGS

2.0 Introduction

2.1 Background

A 180 hectare parcel of land located along Ocean Drive between the townships of Bonny Hills in the south and Lake Cathie in the north has been zoned for residential development (*Residential 2A(1)*) by Port Macquarie Hasting Council. This area was the subject of the Greater Lake Cathie and Bonny Hills Urban Design Master Plan in 2003.

Port Macquarie Hasting Council adopted this Master Plan for the Area 14 Urban Investigation Area in 2004. The Master Plan provides a framework for new urban development along Ocean Drive between Lake Cathie and Bonny Hills, which may ultimately cater for 9,900 residents in what is proposed to be known as the Broader Rainbow Beach Area. Figure 2.1 demonstrates the Area 14 study area.

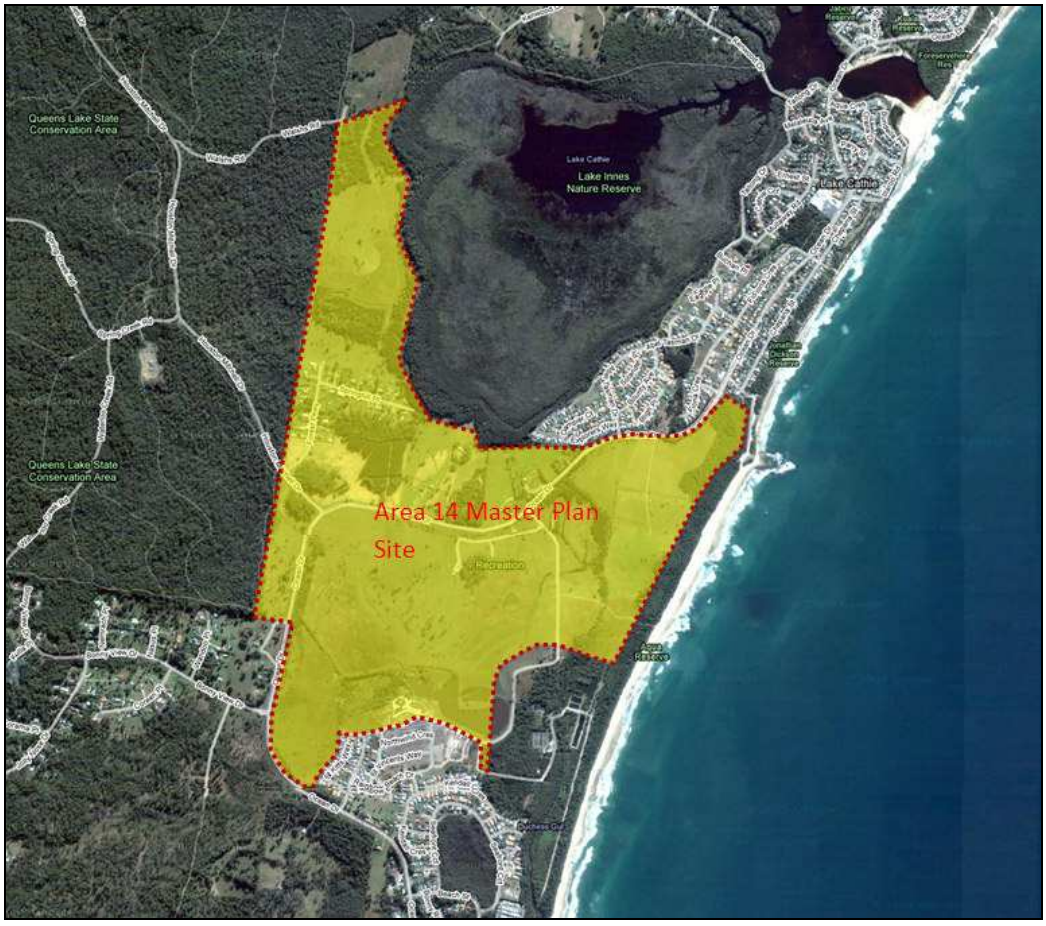

Figure 2.1: Area 14 Study Area

Area 14 is proposed to include the following land uses:

- Approximately 2,160 new dwellings;
- Two School Sites
- District Sporting Fields
- Town Centre
- Open space/Habitat corridor
- Hilltop village centre proposed in the north east sector
- Light Industrial precinct to the west of Ocean Drive
- Future Eco-Tourism development site in the south east sector
- Future urban investigation area to the north off Forest Parkway

Ocean Drive, which runs through the Area 14 study area, is the primary arterial road connecting the coastal town centres of Bonny Hills, Laurieton and Lake Cathie to the regional centre of Port Macquarie. Growth of these coastal centres in recent years has seen traffic along Ocean Drive increase dramatically.

Houston Mitchell Drive is a key connector to the Pacific Highway for these local centres, and as these centres grow, so will the volume of turning movements at the Houston Mitchell Drive / Ocean Drive intersection.

2.2 Scope

Council has stated that the principal objective of this study is to provide traffic information and advice sufficient to enable Council to plan for a road network that:

- is safe and functional;
- operates to an acceptable level of service (LOS) well into the future;
- can be staged in an orderly and cost effective way to service planned land development; and
- establishes a road hierarchy suitable for projected traffic patterns.

Bitzios Consulting and RoadNet have been commissioned to assess the road network and intersection requirements based on Council's indicative network plan as shown in Figure 2.2.

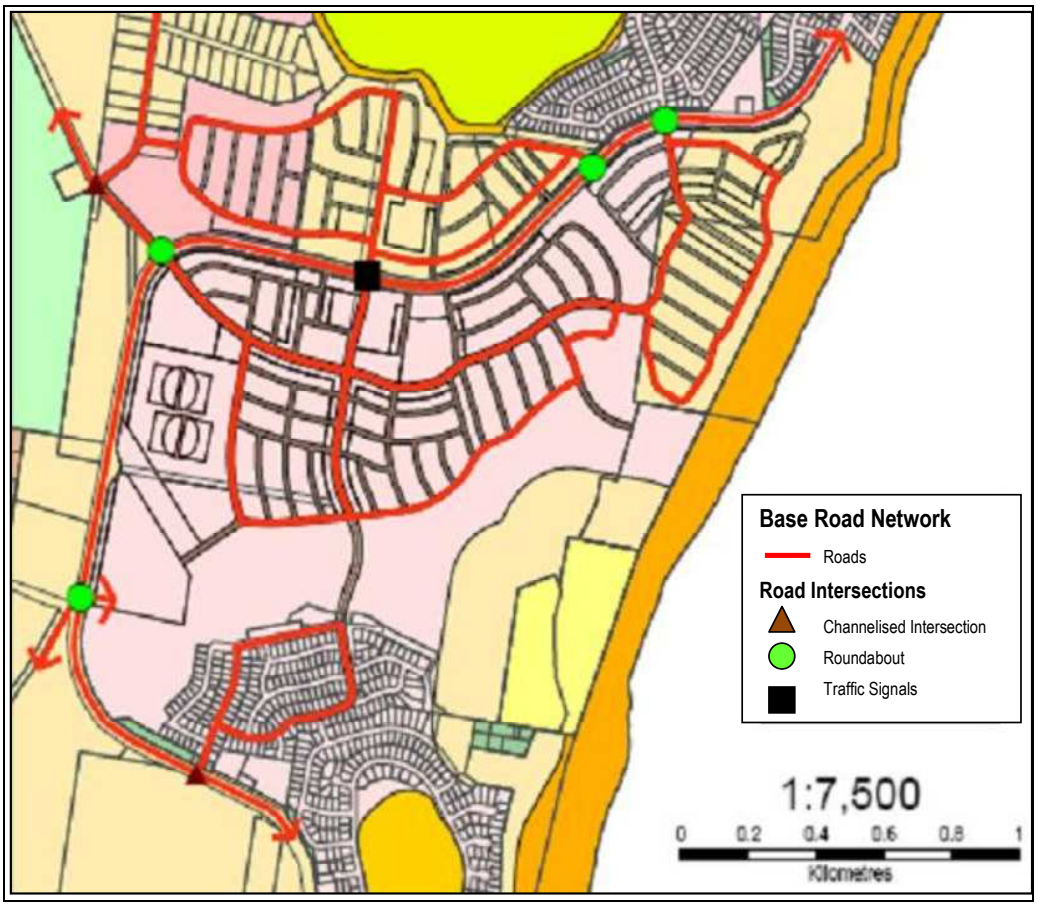

Figure 2.2: Council's Road Network Plan

To enable the testing of alternative road and intersection improvements for future years, a Paramics micro-simulation traffic model was deemed as being necessary for the study area.

This report details the Paramics modelling and traffic infrastructure needs assessment undertaken for the Area 14 Study Area. The scope of this work included:

- undertaking traffic surveys during morning and afternoon peak periods;
- creating and validating base year (2009) AM and PM peak period Paramics models for the study area;
- creating future year (2019 and 2029) AM and PM peak period Paramics models under various network scenarios as follows:
  - Base Existing (Do Nothing);
  - Scenario 1 Development as planned; and
  - Scenario 2 Development with additional residential and link road.

- providing recommendations for improvements considered necessary to the current planned road network, including intersection locations and types.

2.3 Limitations of Use

While the Paramics modelling includes sections of the internal road network to allow development traffic into the model, it should noted that detailed modelling has not been undertaken for the internal road network as part of this study. Some consideration and recommendations have however been included on what impact the internal road network has on the intersections and traffic volumes along Ocean Drive.

Recommendations within this report coincide with the development and land use layout at the time of the study and any changes to the layout require assessment on the impact of the recommended intersection layouts.

2.4 Overview of Paramics

Paramics is a traffic micro-simulation modelling package. Unlike strategic traffic models which "average" conditions over the assessment period and use a limited number of relationships between flow and delay, micro-simulation models assess the movement of each vehicle in the network. This is achieved by simulating the movement of each vehicle relative to other vehicles and the road environment considering parameters such as gap acceptance, acceleration, deceleration, vehicle following behaviours and so on.

By simulating the position of each vehicle at fixed time slices (e.g. every half a second) simulation models are able to estimate queue build up and dissipation, as well as dynamic route choice, as congestion builds.

A number of traffic assignment algorithms are available with varying levels of assumed knowledge of congestion and willingness to divert to alternative routes.

To develop or 'code' the Paramics Model, information such as the existing road network, speed limits, traffic counts, maximum queue lengths and traffic signal data is required. Using the traffic movement (count) data an Origin-Destination Matrix is developed.

Figure 2.3 demonstrates the processes required to develop the Paramics model and some of the possible capabilities of the Paramics package.

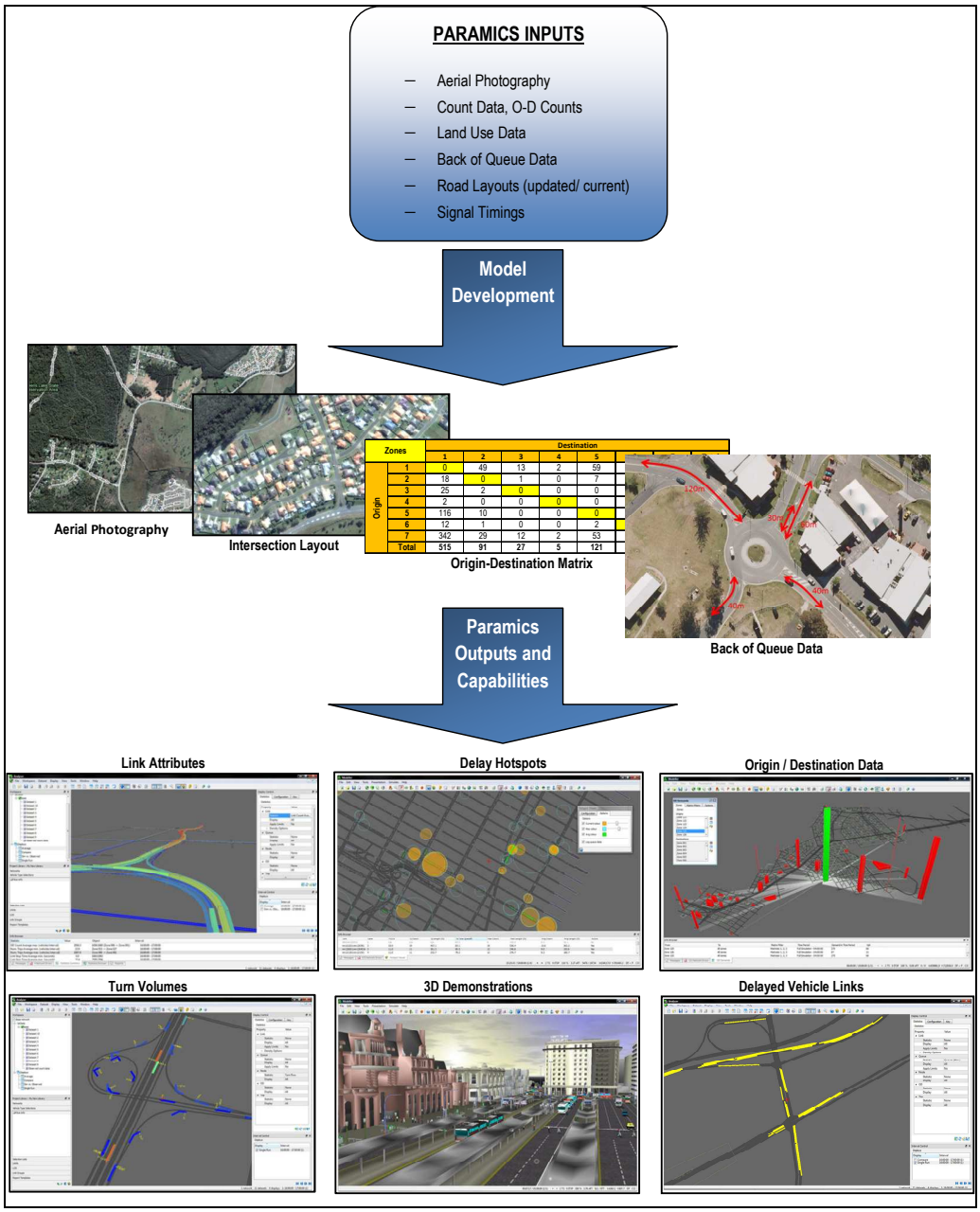

Figure 2.3: Paramics Model Process and Capabilities

3.0 2009 Base Model

The purpose of the 2009 Base Model was to calibrate the model to existing conditions in order to use it for future year assessment option testing. This section details the process of developing the base model and understanding the existing configurations and issues at the intersections in the study area.

3.1 Base Model Input Data

3.2 Base Model Validation and Performance

Validation of the 2009 Base Model was undertaken by comparing the survey count data against the link and turn volume outputs from the 2009 AM and PM Base Models. Standard practice for validating Paramics micro-simulation models is to determine the GEH Value of the network. The GEH statistic compares the observed count data against the modelled output data, using a combination of comparing both relative and absolute differences. GEH is calculated by using the equation below:

$$GEH = \sqrt{\frac{(M-O)^2}{0 \cdot 5 * (M+O)}}$$

Where: M = Modelled Counts; and
O = Observed Counts.

When using the GEH to determine the accuracy of a model, the average GEH value for all links within the network should be compared to the following criteria:

- GEH < 5 - Modelled flows can be considered an accurate fit to observed counts;
- 5< GEH < 10 - Modelled flows required further refinements to observed flows; and
- GEH > 10 - Modelled flows are not considered accurate to the observed flows.

Figure 3.4 shows the comparison between 2009 'observed' survey data and the 'modelled' link volumes from the 2009 AM and PM Base Models. Table 3.1 demonstrates the GEH validation for the 2009 Base Models.

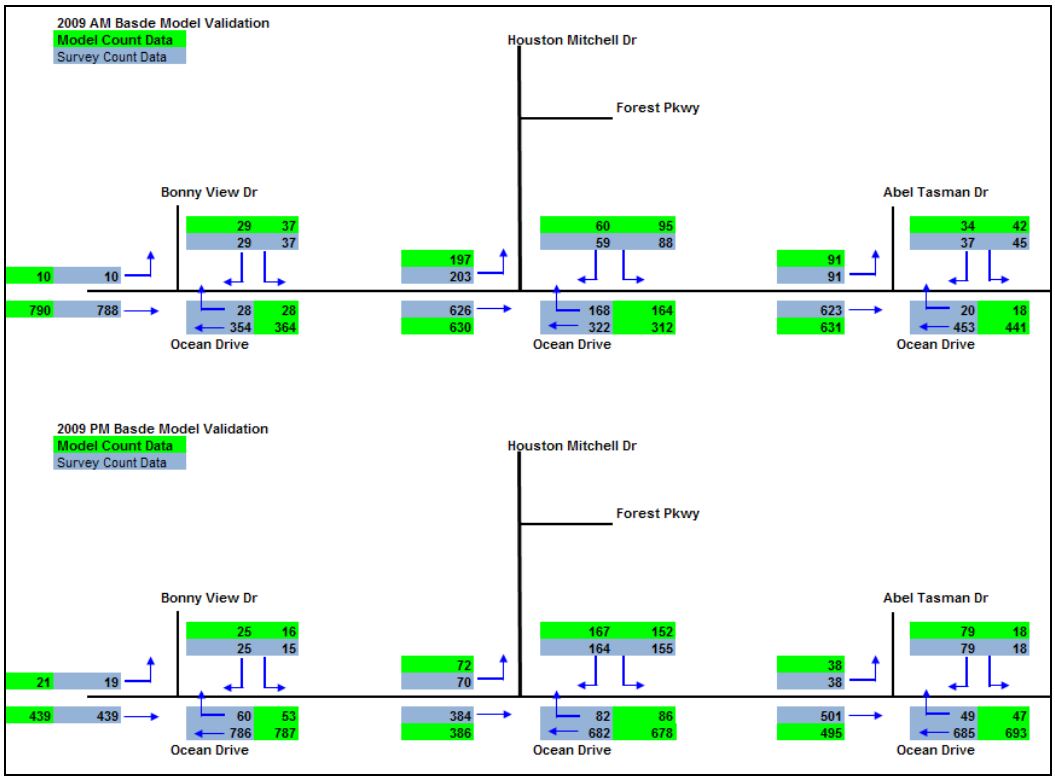

Figure 3.1: 2009 AM and PM Peak Turn Volumes Comparison

Table 3.1 2009 Base Model GEH Validation

Intersection	Approach	Movement	AM Peak		GEH Value	PM Peak		GEH Value
			Observed Count	Modelled Count		Observed Count	Modelled Count	
Ocean Drive / Bonny View Drive	Ocean Drive sth	left	10	10	0.0	19	21	0.4
		though	788	790	0.1	439	439	0.0
	Bonny View Dr	right	29	29	0.0	25	25	0.0
		left	37	37	0.0	15	16	0.3
	Ocean Dr nth	right	28	28	0.0	60	53	0.9
		though	354	364	0.5	786	787	0.0
Ocean Drive / Houston Mitchell Drive	Ocean Drive sth	left	203	197	0.4	70	72	0.2
		though	626	630	0.2	384	386	0.1
	Houston Mitchell Dr	right	59	60	0.1	164	167	0.2
		left	88	95	0.7	155	152	0.2
	Ocean Dr nth	right	168	164	0.3	82	86	0.4
		though	322	312	0.6	682	678	0.2
Ocean Drive	Ocean	left	91	91	0.0	38	38	0.0

Intersection	Approach	Movement	AM Peak		GEH Value	PM Peak		GEH Value
			Observed Count	Modelled Count		Observed Count	Modelled Count	
/ Houston Mitchell Drive	Drive sth	though	623	631	0.3	501	495	0.3
	Abel Tasman Dr	right	37	34	0.5	79	79	0.0
		left	45	42	0.5	18	18	0.0
	Ocean Dr nth	right	20	18	0.5	49	47	0.3
		though	453	441	0.6	685	693	0.3
			Average GEH		**0.3**	**Average GEH**		**0.2**

The average GEH value for both the AM and PM base models is 0.3 and 0.2 respectively, which is well within the allowable margin of error of less than 5. As a result, the 2009 base models provide and accurate representation of the observed count data.

Back of queue data was taken during the AM and PM peak periods and used for calibrating performance of intersection approaches. The majority of approaches to intersections with Ocean Drive did not demonstrate queues in excess of one to two vehicles during the peak periods.

Houston Mitchell Drive exhibited maximum queues of approximately 5 vehicles during both the AM and PM peak period. The queues at this intersection were for the right turn movements from Houston Mitchell Drive and Ocean Drive southbound. Figure 3.2 demonstrates the calibrated queues at Houston Mitchell Drive / Ocean Drive intersection within the 2009 AM peak base model.

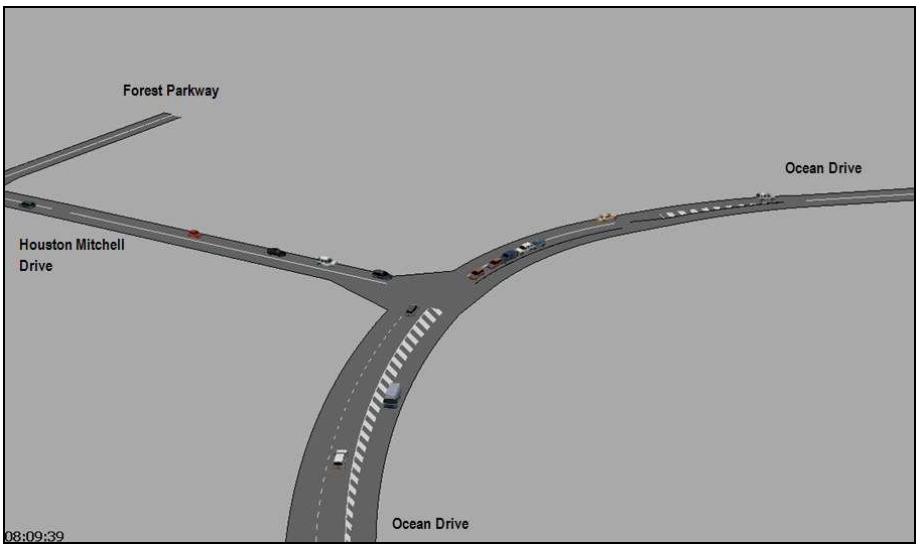

Figure 3.2: Houston Mitchell Drive / Ocean Drive Intersection

During the 2009 AM and PM peak periods, intersections along Ocean Dive within the study area perform within capacity and do not experience adverse intersection delays or queues which extend beyond allowable distances.

Table 3.2 provides the LOS for 2009 Base Model case.

Intersection	2009 AM	2009 PM
Abel Tasman Dr / Ocean Dr	A	A
Houston Mitchell Dr / Ocean Drive	A	A
Bonny View Dr / Ocean Dr	A	A

Link	2009 AM	2009 PM
Ocean Dr (North of Abel Tasman Dr)	A	A
Ocean Dr (Abel Tasman Dr / Houston Mitchell Dr)	A	A
Ocean Dr (Houston Mitchell Dr / Bonny View Dr)	A	A
Ocean Dr (South of Bonny View Dr)	A	A
Houston Mitchell Dr	A	A

3.2.1 Road Geometry and Intersections

Aerial photography was provided by Port Macquarie Hasting Council for the study area and used on a basis for coding road geometry into the model (nodes, links, "kerblines", "stop points", etc). These configurations were verified through site observations. Posted speed limits and intersection priorities were applied to the links in the base model based site observations. Figures 3.3 to 3.5 detail the configuration at intersections along Ocean Road.

Figure 3.3: Abel Tasman Drive / Ocean Drive Intersection

Figure 3.4: Houston Mitchell Drive / Ocean Drive Intersection

Figure 3.5: Bonny View Drive / Ocean Drive Intersection

To provide locations for traffic to be input into the road network, zones have been included within the 2009 model based on the existing road extremities of Ocean Drive, Houston Mitchell Drive, Abel Tasman Drive, Forest Parkway and Bonny View Drive. Figure 3.6 demonstrates the zone system used for the 2009 base model.

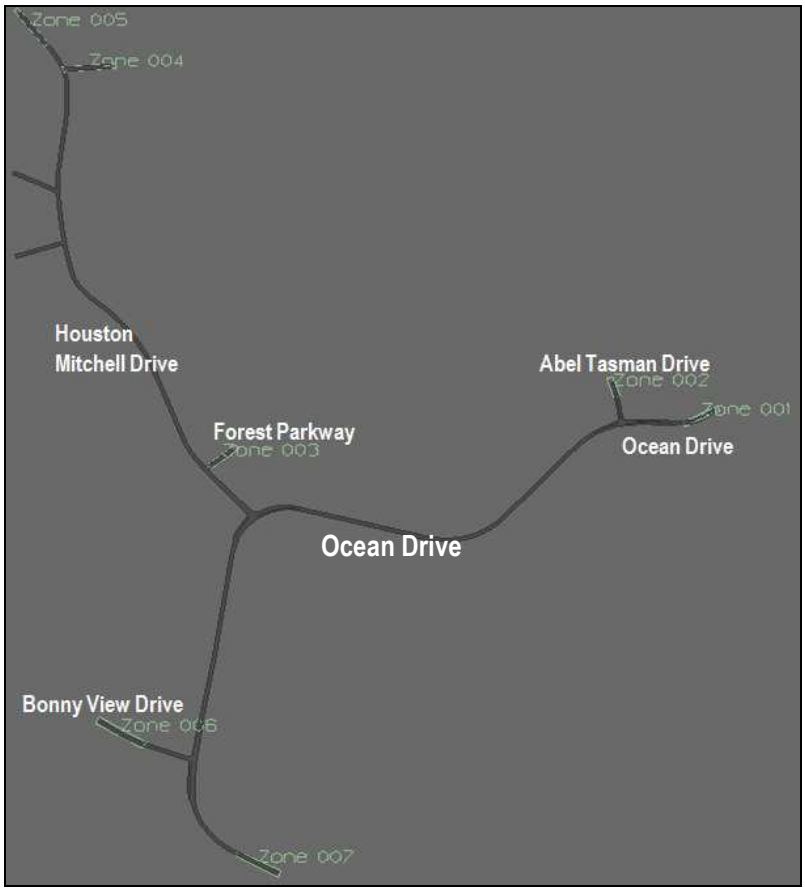

Figure 3.6: Base Model Zone System

3.2.2 Traffic Survey Data

Traffic surveys were undertaken at the key intersections in the study area on Wednesday 18th March and Thursday 19th March 2009 during the AM and PM peak periods. In addition, Council provided 24 hour tube counts across select roads in the study area from Tuesday 17th March to Tuesday 24th March. Numberplate surveys and tube counts were undertaken at the following locations and are shown in Figure 3.7:

Number Plate Survey Locations

1. Houston Mitchell Drive / Ocean Drive;
2. Bonny View Drive / Ocean View Drive; and
3. Abel Tasman Drive / Ocean View Drive.

Tube Count Locations

1. Houston Mitchell Drive, west of Forest Parkway;
2. Forest Parkway, north of Houston Mitchell Drive;
3. Ocean Drive, between Bonny View Drive and Houston Mitchell Drive; and
4. Ocean Drive between Houston Mitchell Drive and Abel Tasman Drive.

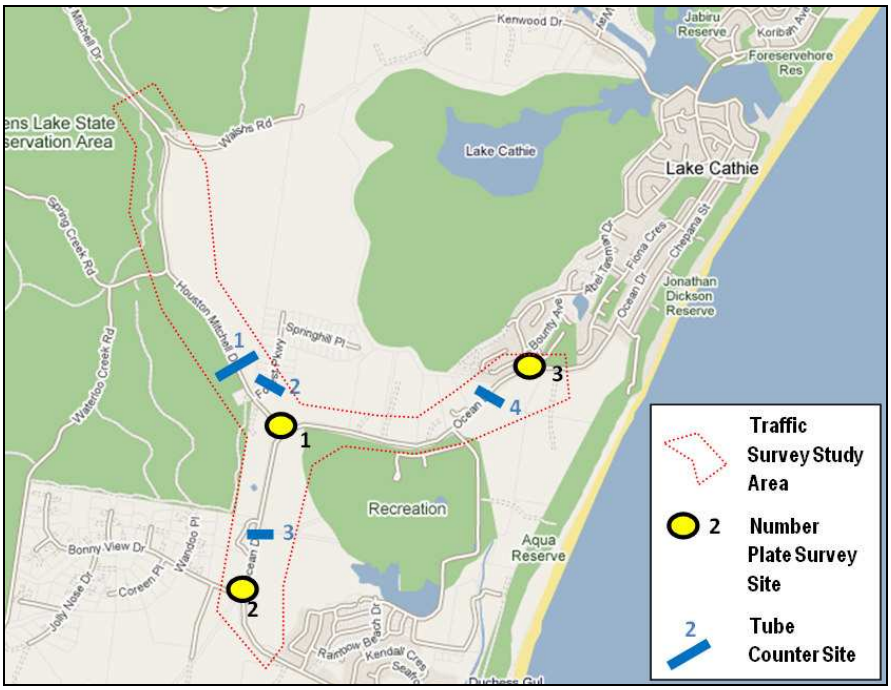

Figure 3.7: Traffic Count Locations

The traffic counts were undertaken during the AM (7:00am – 9:00am) peak and PM (4:00pm – 6:00pm) peak periods and involved recording numberplate data. The numberplate data includes only the 1st three digits of the numberplate which were tabulated at 15 minute intervals for each of the allowable movements at the survey intersections. The numberplate data provides important information including the turning volumes for each movement as well as a basis for creating an Origin-Destination Matrix for the Paramics model.

Tube count data was compared to provide peak hour screen line volumes as well as confirm approach volumes undertaken during the numberplate survey.

The 15 minute intervals for recording the traffic survey data enables the data to be compared and give an understanding of the peak hour traffic profile. Figure 2.3 provides the peak hour percentage of traffic flow for Ocean Drive for AM and PM peak periods. As Ocean Drive is the main thoroughfare through the study area and all surveyed approaches exhibit a similar pattern, the demand profiles shown in Figure 3.8 were utilised for the 2009 base models.